



DEPARTMENT OF THE NAVY
NAVAL MEDICAL RESEARCH CENTER DETACHMENT
LIMA, PERU
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IN REPLY REFER TO
NMRCDINST 5100.9A
15 Mar 2004

NMRCD INSTRUCTION 5100.9A

From: Officer-In-Charge, U.S. Naval Medical Research Center
Detachment Lima, Peru
Distribution

Subj: COMMAND SAFETY PROGRAM

- (a) OPNAVINST 5100.23 Series
- (b) OPNAVINST 5102.1 Series
- (c) NAVSUP PUB 753
- (d) OPNAVINST 112320.23 Series
- (e) NAVMEDRSCHINSTITUTEINST 5100.4
- (f) NAVMEDRSCHINSTITUTEINST 5102.1 Series

Encl: (1) NMRCD Lima, Peru Laboratory Safety Manual
(2) Mishap Report
(3) Navy Employee Report of Unsafe or Unhealthful
Working Conditions

1. Purpose. To outline the NMRCD Safety Program and to assign responsibilities for its implementation and accomplishment.

2. Cancellation. NMRCD Instruction 5100.9

3. Background. It is the policy of the Navy to provide safe and healthful conditions in the work place for all Navy civilian and military personnel. An effective and aggressive safety program shall be maintained to ensure protection of all personnel from work-related mishaps, injuries and illnesses with accident prevention as the primary goal.

4. Policy. References (a) through (f) provide the basic guidelines that are to be adhered to in establishing the NMRCD Safety Program with the major aspects summarized below:

a. Safety at NMRCD is an inherent responsibility of all personnel. The identification of hazardous conditions, practices and effective follow-up to correct such hazards is necessary to the success of the Safety Program. It is incumbent upon all members of this command to detect, identify and report suspected hazards to their supervisors and/or Safety Officer. A successful Safety Program requires all functions necessary to

related risks, injuries and accidental losses to an absolute minimum. Enclosure (1) is provided to all hands as a general outline, and handy reference of the command's policies and procedures.

b. The safety of staff, employees, and visitors shall be assured by proactive identification of hazards and corrections to include investigation and inspection procedures.

c. Supervisors shall always be alert for conditions or acts that may cause accidents or injury to personnel. They shall take prompt action to correct all recognized safety and health hazards they discover or items brought to their attention by their seniors or subordinates. Failure to respond rapidly may be interpreted as lack of concern for safety.

d. Precedence in methods for correcting deficiencies is:

(1) Substitution of less hazardous materials, equipment or operation

Engineering controls

Administrative control.

5 Action. The following responsibilities are assigned

a. Safety Officer. The Safety Officer shall be appointed in writing by the Officer-In-Charge and will implement the policy of the Officer-In-Charge utilizing this instruction and its references as guidelines. Additionally, he shall:

(1) Discharge the tasks required for effective management of the Command Safety Program.

(2) Develop and maintain NMRCD safety rules and regulations as approved by the Officer-In-Charge.

(3) Advise the Officer-In-Charge, division heads and staff personnel on safety matters.

(4) Review reports of accidents and injuries and analyze each report, maintain a record of all injuries and occupational illnesses in accordance with reference (b).

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(5) Ensure that required safety reports are submitted to higher headquarters.

(6) Coordinate and monitor command safety training program insuring that all personnel understand safety principles and practices.

(7) Conduct safety inspections in conjunction with the annual industrial hygiene survey and command zone inspections to identify safety and occupational deficiencies and report findings to the Commanding Officer.

(8) Promote and maintain the interest of personnel in regard to safety issues both on and off duty through training lectures, safety articles, handouts, etc.

(9) Maintain adequate safety references, publications and educational materials.

(10) Perform other safety related functions as directed by the Officer-In-Charge.

b. Facility Management Branch shall:

(1) In consultation with the Safety Officer, maintain a priority system to correct identified safety hazards. It shall provide rapid response to any condition that may cause injury to personnel.

(2) Ensure safety considerations are taken in the use and maintenance of equipment, materials and services.

(3) Ensure completion of electrical inspection and documentation per references (c) and (d).

c. Department Heads are required to:

(1) Enforce and adhere to safety rules and regulations

(2) Promote a proper attitude of supervising personnel in regard to safety in their area of responsibility.

d. Supervisors are required to:

(1) Provide ongoing instruction to personnel as to safe practices and safety regulations.

(2) Ensure correction of unsafe conditions by the following methods and advise seniors of the means of control:

(a) When possible, perform on-the-spot correction by removing faulty equipment from service, relocating equipment, personnel or processes and/or use of warning tags.

(b) Prepare work requests for necessary repairs.

(3) Train new personnel in the proper use of equipment and the precautions necessary for ensuring a safe working environment.

(4) Provide personal protective equipment for staff enforce their use.

(5) Analyze accidents that occur within their area of responsibility and recommend appropriate corrective action to prevent recurrence.

(6) Develop and maintain safe operating procedures (SOP's) for all operations in their area. Ensure each person is aware of and has ready access to these SOP's.

e All personnel are required to:

(1) Comply with NMRCD safety rules and regulations. Violators of these regulations are subject to disciplinary action.

(2) Wear personal protective equipment on the job as required, i.e. gloves, safety shoes, hearing and eye protection

(3) Advise supervisors of unsafe conditions practices and be willing and ready to instruct new personnel.

(4) Assist supervisor in completing reports on occupational injuries.

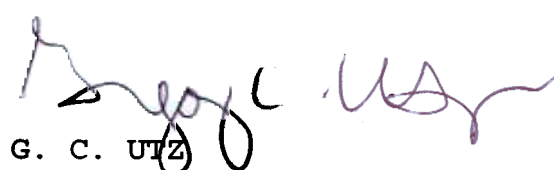
(5) Become thoroughly conversant in and knowledgeable enclosure (1).

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(6) Use OPNAV Form 5100/11 (Report of Unsafe/Unhealthful Working Conditions) and the Mishap Report form (enclosures 2 and 3) to inform the Safety Officer of potential safety hazards.

6. Applicability. This instruction applies to all personnel attached to NMRCD Lima, Peru. The Officer-in-Charge, NMRCD Lima, Peru, is tasked with promulgating this command instruction in order to ensure personnel are adequately protected against work-related injuries. Training and education related to safety is of the highest priority.



G. C. UTZ
Acting

U.S. NMRC LIMA, PERU

LABORATORY SAFETY MANUAL

SAFETY IS EVERYONE'S BUSINESS.... Personnel working in our NMRC laboratory facilities must develop a positive attitude towards compliance with safety rules and regulations. Laboratory personnel are exposed to all types of hazards including electrical, compressed gases, chemical and toxic materials, carcinogens, microbiological, and fire hazards. It is essential that all personnel become familiar with, and adhere to the guidelines in this manual.

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LABORATORY SAFETY MANUAL

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SECTION I

Introduction

1. The laboratory and animal facility are potentially hazardous work areas and it is the responsibility of everyone to help prevent accidents and injuries. For personnel protection, everyone must be familiar with standard safety practices and procedures. Everyone must understand the motives behind the regulations and must observe established policies. Supervisors have the responsibility of providing safe work areas by ensuring safety practices. This manual shall serve as a basis for safe laboratory operation. This manual shall be followed in addition to the Command Safety Program Instruction and the guide for care and use of laboratory animals.

2. A Laboratory Safety Representative (LSR) is appointed by the Department Head, for each laboratory under their direction. The Laboratory Safety Manager shall assist the Command Safety Officer in:

a. Coordinating and documenting activities of the command safety programs pertaining to the laboratory.

b. Administering the laboratory safety program, formulating recommendations for specific actions and acting as the safety information resource for all laboratory divisions.

c. Supervising the resolution of all laboratory safety accidents/incidents and administering the laboratory accident report system.

d. Conducting periodic laboratory safety inspection

e. Coordinating safety continuing education programs

f. Maintaining proper storage and an inventory of laboratory chemicals within their spaces.

g. Acting as liaison with the Command Safety Officer.

h. Forwarding safety related reports to the Command Safety Officer via Program Directors.

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3. A COPY OF THIS SAFETY MANUAL WILL BE PLACED IN A CENTRAL LOCATION WITHIN ALL NMRCD LIMA AND IQUITOS PERU LABORATORIES, ANIMAL FACILITY AND WAREHOUSE SO THAT IT WILL BE AVAILABLE TO ALL PERSONNEL.

SECTION II

General Requirements for Personnel and Laboratory Safety

1. **HANDWASHING.** Hands should be washed frequently during the day, before leaving the laboratory, before and after each work session in the laboratory, smoking, eating or drinking.

2. **ORAL HAZARDS.** Due to microbiologic and toxic hazards to lab personnel, the following practices are prohibited in technical work areas:

- a. Eating and drinking
- b. Smoking (also a fire hazard!)
- c. Applying cosmetics
- d. Mouth pipetting (use mechanical pipettes)
- e. Placing food in technical refrigerators
- f. Touching the face, biting fingernails, chewing on pens and pencils, etc.

3. **CLOTHING.**

a. Suitable protective gear must be worn while working in the laboratory or animal facility. Exposed personnel must wear lab coats, eye protection and gloves while in the laboratory. Fabrics with a high content of acetate or other flammable materials should not be worn. Loose, unsecured articles of clothing (e.g. ties, ribbons, etc.) that may come in contact with work surfaces or equipment must not be worn. All personnel should be aware of the possible hazards of laundering contaminated clothing.

b. Shoes should be comfortable and designed to cover the whole foot without open toes or open heels. All personnel should be aware of the possible chemical or infection hazards from spills that come in contact with footwear. Appropriate precautions should be taken.

c. Jewelry will be permitted only if it does not present a hazard (e.g. dangling items that may become entangled in machinery).

4. ELECTRONIC DEVICES.

a. Earphones/headsets. Earphones/headset musical listening devices are not permitted within any laboratory space.

b. Cellular telephones. Cellular telephones are not allowed within the laboratory spaces. All personnel shall leave their cellular telephone (turned off), in a secure location along with their personal belongings.

5. **HAIR AND BEARDS.** Hair and beards shall be trimmed or secured to avoid contact with laboratory surfaces or equipment (Microbial organisms are easily passed from work surfaces to workers (and vice versa via hair). Serious injuries can result if hair becomes entangled in automated equipment.

6. **CONTACT LENSES.** Contact lenses, especially soft lenses, may absorb certain solvents and may concentrate caustic substances against the cornea in the event of a splash. In general, the use of contact lenses is discouraged. When operating in an eye hazard location, contact lenses shall only be used in conjunction with the appropriate safety eye protection. Those persons who must handle hazardous quantities of caustic and corrosive chemicals (i.e. in amounts that could pose splash or vapor hazards) shall not wear contact lenses.

PERSONAL PROTECTION EQUIPMENT.

a. When necessary, the availability and use of personal protection equipment is required and includes, but is not limited to, the following examples:

(1) Handling hot materials, autoclave and incinerator operations: Use autoclave gloves (or equivalent) to remove all materials from autoclaves or to place into incinerator and use a full-face shield when opening an autoclave or incinerator door.

(2) Handling extremely cold materials including liquid nitrogen and ultralow freezer contents: Use insulated gloves (or equivalent) and/or tongs, as appropriate. Use eye protection (i.e. safety glasses, goggles) when handling liquid nitrogen.

(3) Handling caustic and corrosive materials, that could pose splash or vapor hazards, especially in large amounts: Use chemical resistant gloves and aprons as well as face protective devices (full-face shields). Don't wear contact lenses in these circumstances even if other protective devices are in use.

(4) Transferring significant quantities of caustic, corrosive, flammable or highly toxic chemicals: Handle one container at a time. Use carts when moving from one area to another.

(5) Working with toxic, flammable, caustic or irritant chemicals that are volatile: Use a fume hood with the sash positioned to provide an airflow rate of at least 100 linear feet per minute.

(6) Handling body fluids: Wear lab coat with long sleeves. Disposable latex gloves and protective eyewear shall also be worn. Gloves shall be removed before handling "non-contaminated" items such as phones, computers, paper work, etc. These guidelines apply to all body fluid specimens even if patient is not of a known risk.

8. HOUSEKEEPING.

a. Exits and aisles are not to be obstructed by equipment, chairs, supplies or refuse. Exit doors shall remain closed and free of obstructions. Exit doors shall not be locked in any manner to prevent emergency egress while workspaces are occupied.

b. All laboratory spaces are to be kept clean and excess refuse of any sort will not be allowed to accumulate in any area.

c. Spills are to be cleaned up immediately

9. **GLASSWARE.** Broken or chipped glassware shall not to be used and should be discarded in rigid containers (e.g. carboys, cardboard boxes) placed specifically for that purpose. Broken glass is never to be placed free in the regular trash.

10. CENTRIFUGES.

a. Do not operate centrifuges unless covers are closed and do not open the lid until the rotor has come to a complete stop.

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Unsecured dangling items (hair, beards, ties, ribbons, jewelry, etc.) that may become entangled in centrifuges are not permitted.

b. DO NOT centrifuge uncovered tubes of specimens (blood, urine, sputum) or flammable liquids. Centrifugation creates a vacuum and volatilizes liquids (Contaminated items become aerosols, flammable liquids become explosives, etc.) Always use caps or parafilm.

c. Carefully weight balance centrifuge tubes prior to centrifugation.

d. Use explosion-proof centrifuges for work with flammable liquids.

11. SYRINGES, NEEDLES, OTHER HAZARDOUS OBJECTS

a. Syringes, needles and other sharps (Simplates, lancets, etc.) are to be sealed in an impervious, rigid-walled container, sealed when filled up to 3/4 full, and disposed of as infectious waste to ensure destruction by incineration.

b. Syringes and needles are NOT to be clipped or recapped.

12. **HEARING HAZARDS.** Exposed personnel must use the established hearing protection when mandated by a hearing protection program. Industrial Hygiene survey identified laboratory personnel must be enrolled in the hearing conservation program.

13. **SINKS.** To avoid siphoning of contaminated water into the general water system, water faucet outlets are not to extend below the rim of the sink, especially rubber tubing extensions. If this is necessary under unusual circumstances, anti-siphon devices are mandatory.

14. EVACUATION ROUTES

a. Each section of the laboratory is to have a prominently displayed floor diagram of the laboratory space depicting all evacuation routes.

b. All personnel are to be familiar with the evacuation routes.

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- c. Exits are to be clearly marked by exit signs or lighted directions.

Enclosure (1)
NMRCINST 5100.9

~~d. Exit doors are not to be blocked, obstructed, locked, or otherwise fastened so as to prevent exit while spaces are occupied.~~

15. MISCELLANEOUS.

a. Working alone in the laboratory is discouraged. When necessary, however, others should know the solitary worker's whereabouts and periodic contact should be planned (e.g. Command Duty Officer rounds).

b. Horseplay is never permitted in the laboratory.

c. All staff should be familiar with cardiopulmonary resuscitation.

d. The use of extension cords is generally prohibited except under extenuating circumstances.

e. Always use a portable ladder to reach high places.

f. Do not hang clothing on or near heating instruments or open flame. Designate a clean clothing area to hang clothing to be worn outside the laboratory spaces.

g. Festive decorations will be limited to designs on glass outside of laboratory work areas. Hanging decorations and wax candles are prohibited. Decorations on lights and instruments are prohibited.

h. Hot glass containers will be handled with heat resistant gloves.

i. Dry ice will be handled with heavy cotton (heat resistant gloves) and will not be used for experiments.

j. All unsafe practices should be reported through the chain of command to the Laboratory Safety Officer. **Anonymous reports may be made directly to the Command Safety Office.**

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will muster the staff and ensure accountability of all personnel.

16. LABORATORY ACCIDENT AND SAFETY INCIDENT WORKSHEET

a. IN CASE OF ACCIDENT OR INCIDENT:

(1) Always complete a "Mishap Report Form", Enclosure (2) and forward it to the Command Safety Officer through the Laboratory Safety Representative (LSR) at the earliest possible convenience.

(2) If the accident or incident is serious, the LSR should contact the Command Safety Officer or the Occupational Health Officer as soon as possible. If there is any question regarding the incident or further safety risk, **ALWAYS** notify the Department Head or Supervisor, Command Safety and the Occupational Health Officers or if after hours, the Command Duty Officer (CDO) on call.

(3) In all cases of accidents or safety incidents the Officer-In-Charge shall be notified as quickly as possible of the occurrence. He shall be given a brief summary of the nature of occurrence to include:

Extent of injury or injuries to personnel,

Extent of damage to equipment and/or facility

Estimated Mishap category level and

Preliminary investigation findings

SECTION III

WARNING SIGNS AND LABELS

1. LABELS

a. All reagents and chemicals must be labeled with the following information

- (1) Contents
- (2) Strength/Concentration (when applicable)
- 3) Date prepared or opened.
- (4) Expiration Date

b. The label on all hazardous chemicals will also indicate:

- (1) DANGER, WARNING OR CAUTION in bold letters.
- (2) Type of hazard - poison; flammable, carcinogen, caustic/corrosive' irritant' explosive (reactive).
- (3) Precautions-avoid skin contact; use in fume hood; keep from flame; etc.
- (4) Instructions in case of accident

2. **STORAGE LOCKERS.** All storage lockers containing flammable, corrosive or highly toxic reagents and chemicals will be clearly labeled externally as to the storage locker contents.

3. POSTED AREAS

a. Areas with special hazards or precautions will be posted with OSHA approved signs: **BIOHAZARD; RADIATION HAZARD; POISONS; LABORATORY PERSONNEL ONLY; FLAMMABLE;** etc.

b. All doors to laboratory work areas will be posted with approved biohazard signs and hazard identification labels.

c. All laboratory areas will be posted with "NO SMOKING" signs.

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SECTION IV

CHEMICAL SAFETY

1. Chemicals routinely used in the clinical lab may be toxic, corrosive, flammable, explosive or any combination of the above. Misuse of these chemicals can result in severe morbidity or even mortality. All laboratory personnel have a responsibility to be aware of the inherent hazards of chemical manipulation, and to take the appropriate cautions to obviate hazards. Additionally, it is each member's responsibility to familiarize themselves with the NMRC Chemical Hygiene Plan. The department head through their laboratory supervisor or Laboratory Safety Representative (LSR) shall maintain an inventory of chemicals used within the laboratory.

2. WARNING SIGNS, POSTED AREAS AND LABELS

a Observe the requirements delineated in Section 6

b. To reiterate, all hazardous chemicals must be labeled with the following information:

DANGER, WARNING OR CAUTION in bold letters

(2) Type of hazard - poison, flammable, carcinogen, corrosives, irritant, explosive (reactive)

(2) Precautions - avoid skin contact; use in fume hood; Keep from flame; etc.

Instructions in case of accident

3. **VARIETIES OF HAZARDOUS CHEMICALS** - Hazardous chemicals frequently fall into more than one of the following categories:

a. **POISONOUS or TOXIC** - Virtually all chemicals can be considered toxic. For practical safety considerations, however, the term "poison" refers to those substances that are highly injurious to health or fatal, immediately or chronically, in small amounts, whether ingested, inhaled or contacted by the skin or mucous membranes. Poisons may be solids, liquids or gases. Carcinogens are considered poisons and are dealt with separately in the latter portions of this section.

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b. **CORROSIVE or CAUSTIC** - Corrosive substances are those, that by direct contact, cause tissue damage and necrosis, whether ingested, inhaled or contacted by the skin or mucous membranes. Corrosives may be solid, liquid or gas. Examples of laboratory corrosives are found in Tables I, II and III.

c. **FLAMMABLE** - Flammable materials easily ignite, burn and serve as fuel for a fire. National Fire Prevention Association definitions:

(1) CLASS I FP < 100 degrees F (Regarded as highly flammable because vapors are given off at ambient room temperatures capable of ignition by spark flame.)

(2) CLASS II FP > 100 but < 140 degrees F

(3) CLASS III FP > 140 degrees F; (FP = FLASH POINT Flash point is that temperature at which sufficient vapors are given off that can readily be ignited in air by spark or flame.)

d. **EXPLOSIVE** -Chemicals that are explosive or may cause explosive chemical reactions with certain other substances. Explosivity is often closely associated with flammability.

4. PRECAUTIONS

a. Never sniff reagents.

b. Unauthorized experiments are prohibited

c. Never combine any chemicals (unless you know exactly how they will react.

d. When diluting, use great care and add reagents slowly. Never add corrosives (acids, bases, etc) directly to water. To dilute a corrosive liquid, allow it to run down the side of the container of water and mix slowly by gentle rotation.

e. Corrosive, toxic or flammable chemicals that are also volatile are to be used in a fume hood.

NOTE: The hood sash should be situated to achieve an airflow rate of no less than 100 linear feet per minute. Sash positions should be marked on the hood.

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f. For daily routine handling of corrosives (including changing the tubing on automated equipment) eye protection (at least safety glasses or goggles) and protective clothing (lab coats, tech jackets, etc) are required. When handling large volumes of corrosives, full-face shields, chemical resistant gloves and aprons are required, as necessary.

g. When transferring toxic, flammable or corrosive chemicals:

Handle one bottle at a time using two hands.

(2) Use acid bottle carriers for any liquid in a breakable or spillable container that is greater than 500 ml (1 pt).

Use stable carts, as appropriate.

h. Do not use flammable liquids in the presence of ignition sources (open flames, cigarettes, heating elements, equipment spark gaps), and vice versa.

i. If a quantity of a flammable liquid (Class I, II, or III) that requires heating exceeds 10 ml or will be heated to within 30 degrees F of its flash point, extreme care will be used and the procedure will preferably be conducted in a fume hood with the sash positioned to protect personnel. NEVER USE A FLAME to heat flammable liquids but rather, hot water or steam.

j. Do not use flammable solvents for general cleaning.

5. STORAGE

a. GENERAL.

(1) Minimize the quantities of stored chemicals

(2) In storage, arrange reagents by chemical groups and always avoid close proximity of non-compatible chemicals. It is strongly recommended not to alphabetize storage areas because incompatible chemicals tend to become juxtaposed.

(3) Never store hazardous liquids at eye level or above on open shelves.

(4) Storage shelves for liquids in spillable or breakable containers should have lips.

b. FLAMMABLES

(1) Quantities of Class I flammables outside safety cabinets must be in safety cans if greater than 500 ml (1 pt). The maximum safety can size is 5 gal, except for Class IA flammables (FP < 73 degrees F) for which maximum size is 2 gal.

(2) The purpose of a safety cabinet is to retain spills and leaks, and, in a fire, to keep the inside temperature low enough to prevent ignition of flammables so that personnel can escape from the area. In a severe fire, the contents of a safety cabinet may well ignite and explode after a relative short period of time. Within safety cabinets, the use of safety cans, regular reagent cans, glass and approved plastic containers for storage is acceptable. Safety cans, however, are the containers of choice.

(3) For each 5000 sq.ft.laboratory space, the following maximum amounts of flammable chemicals are permissible:

(a) Outside of safety cabinet, 10 gallons.

(b) Within safety cabinet, 60 gallons

(4) At the workbench, only one day's supply or one container, whichever is less, maybe maintained as working stock.

(5) It is absolutely necessary that small amounts of flammables requiring refrigeration be stored in explosion-proof refrigerators.

(a) "Explosion-proof" merely indicates an absence of sources of ignition (i.e. exposed switches, exposed temperature dials, exposed lights, etc). If the contents are ignited, these refrigerators can explode, as would any regular appliance.

(b) Explosion-proof refrigerators should be wired directly to electrical sources rather than by plug-receptacle type junctions.

(c) Refrigerators containing reagents must be clearly labeled to indicate contents and hazards.

(6) The use of ethers must be closely monitored. Only small quantities are allowed in the laboratory.

(a) Ether is procured in safety cans and must be stored in the original container.

(b) Store small amount of ether on the open bench. Because of its extreme volatility, strict fire precautions must be observed.

(c) Do not store ether in refrigerators or freezers since fumes may become concentrated and therefore, constitute a fire hazard.

(d) Keep cans sealed and discard outdated ether since with time it forms explosive peroxidase which becomes concentrated by evaporation. Containers should not be kept any longer than 12 months.

(e) Routine disposal of ether will be arranged through the Hazardous Materials(HAZMAT) Coordinator.

6. SPILLS

a. All significant spills of hazardous materials are to be reported on the "Mishap Report Form", Enclosure (2), to the Laboratory Safety Manager and Command Safety Officer immediately. Refer to Section X of this manual for reporting guidelines.

b. Do not hesitate to contact the NMRCD Chemical Hygiene Officer or Command Safety Officer for assistance in spill cleanup.

c. Acids - Refer to TABLE IV.

d. Bases - Refer to TABLE IV

e. Flammables - See TABLE IV

f. Mercury

(1) Avoid spills of elemental mercury.

(2) Clean up spills by covering the spill with HGX powder and carefully sweeping into a double plastic bag. Ventilate well to remove mercury vapors.

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(3) Mercury is not to be put down the drain. Consult the Safety Officer or HAZMAT Coordinator for instructions on proper disposal.

7 FIRST AID

- a. Corrosive spills to the skin - Refer to TABLE V.
- b. Corrosive spills to the eyes - Refer to TABLE V
- c. Fire first aid - Refer to SECTION V

8. OTHER SPECIFIC INFORMATION

a. Azides - Azide containing reagents are not to be used in the lab if at all possible. They form explosive compounds with copper and lead plumbing. They must never be put down the sink or placed in the trash. If you are using azides, contact the Command Safety Officer.

b. Formalin and aromatic hydrocarbons (e.g. xylene) - Care should be taken to provide adequate ventilation to areas using these chemicals. They appear to have toxicities that are not completely characterized at present, including possible carcinogenicity in some cases.

(1) The following precautions for xylene use in the laboratory should be observed:

Containers should be sealed at all times.

(b) Large quantities used for cleaning baskets and cassettes should be returned to a safety can when not in use.

Observe flammable liquid precautions.

c. Picric acid

(1) Old picric acid crystallizes. The crystals are highly explosive.

(2) Do not allow old picric acid to accumulate

(3) If you find an old bottle, don't touch it! Call the Command Safety Officer or HAZMAT Coordinator for assistance with the disposal.

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TABLE I

CORROSIVE LIQUIDS COMMONLY USED IN THE LABORATORY

CORROSIVE LIQUID	CORROSIVENESS & TOXICOLOGY	HAZARD IDENTIFICATION			
		HEALTH	FLAM	REACT	OTHER
ACIDS					
ACETIC ACID	E, S	2	2	1	
CARBOLIC ACID	Sy, E, (Burn)	3	2	0	LETHAL
CRESYLIC ACID	Sy, E,	3	2		
FORMIC ACID	S	3	2	0	
HCL	Sy, E, URI, GI	3	0	0	
NITRIC ACID	Sy, E, URI, GI	3	0	1	OXIDIZER EXPLOSIVE
OXALIC ACID	Sy, S, GI	2	1	0	
PERCHLORIC ACID	E, S, GI	3	0	3	OXIDIZER
PHOSPHORIC ACID	E, S, GI	2	0	0	
PICRIC ACID	E, S, URI, GI	2	4	4	OXIDIZER EXPLOSIVE
SULFURIC ACID	E, S, GI (DEEP BURN)	3	0	2	W
TRICHLOROACETIC	E, S, GI	3	2	1	

Sy = SYSTEMIC
 E = EYES
 S = SKIN
 URI = UPPER RESPIRATORY TRACT
 GI = GASTROINTESTINAL TRACT
 0 = LEAST HAZARD
 4 = HAZARD SEVERITY, 4 BEING THE GREATEST HAZARD

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TABLE II

CORROSIVE SOLIDS COMMONLY USED IN THE LABORATORY

CORROSIVE SOLID		CORROSIVENESS	HAZARD IDENTIFICATION			
		& TOXICITY	HEALTH	FLAM	REACT	OTHER
ALKALI METALS						
Na, K, Li, (& SALTS)	E, S, (Deep burns	3	1	2	w	
ALKALI EARTH						
Ca, Mg, Ba (& SALTS)	E, S	1	1	2	w	
TRANSITION ELEMENTS						
I, Fe, Hg, (SALTS)	Sy, S	1-3	2	1		
COMPOUNDS						
DISULFIDES	S	1	0		0	
CARBONATES	S	1-2	0		0	
CYANATES	Sy, E, S	3	0		0	POISON
DICHROMATES	S	1	0			
OXIDIZER						
FERROCYANATES	S	1	0		0	
HYDROXIDES	E, : GI	1-3	0		1	
OXIDES	E, : URI	1-2	0			
PERMANGANATES	E, :	1-2	0		1	

POISON

Sy = SYSTEMIC
E = EYES
S = SKIN
URI = UPPER RESPIRATORY TRACT
GI = GASTROINTESTINAL TRACT
0 = LEAST HAZARD
1 - 4 = HAZARD SEVERITY 4 BEING THE GREATEST HAZARD
W = DO NOT USE WATER

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TABLE III

CORROSIVE GASES COMMONLY USED IN THE LABORATORY

CORROSIVE GAS	CORROSIVENESS & TOXICITY	HAZARD IDENTIFICATION			OTHER
		HEALTH	FLAM	REACT	
GROUP I					
AMMONIA	Sy, URI	2	1	0	POISON
ACETIC ACID	Sy, URI	2	2	1	
CARBOLIC ACID	Sy, URI	3	2	0	
FORMALDEHYDE	Sy, URI	2	2	0	
HCL	Sy, URI	3	0	0	OXIDIZER
NITRIC ACID	Sy, URI	3	0	0	
SULFURIC ACID	Sy, URI	3	0	2	
GROUP II					
ASPHYXIANT GASES	Sy, URI	1-3	2-4	0	ANESTHETIC
GROUP III					
ALIPHATIC HYDROCARBON@	Sy	1-2	1-4	0-2	ANESTHETIC
AROMATIC HYDROCARBONS#	Sy, S	1-2	1-3	0	
HALOGENATED HYDROCARBONS\$	Sy	1-3	0	0	ANESTHETIC
ALCOHOLS, ETHERS	Sy, E, S, URI	1-2	1-4	0-2	ANESTHETIC
GROUP IV					
INORGANIC & ORANOMETALIC GASES	LUNG PARENCHYMA	1-2	0-3	0-2	
FLAM	= FLAMMABILITY	REACT	= REACTIVITY		
Sy	= SYSTEMIC	E	= EYES		
S	= SKIN	URI	= UPPER RESPIRATORY TRACT		
3	= TOLUENE, XYLENE				
2	= METHANE, ETHANE, PROPANE, BUTANE,		HEXENE, ETHYLENE		
4	= CHLOROFORM, CARBON TETRACHLORIDE,		CHLOROBROMOMETHANE		

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TABLE IV
CHEMICAL SPILLS

1. GENERAL

a. If a large spill of hazardous materials occurs: Work quickly, but remain calm. If you don't know what to do find someone who does.

b. If a flammable hazard exists, eliminate open flames.

c. Alert personnel in the area and evacuate if a hazard exists (vapor, fire hazard, etc.)

d. When cleaning up, use protective equipment as necessary. If there is a major problem, do not hesitate to call for assistance. Moderate to large spills of corrosive materials require the use of:

(1) Protective long sleeved coat and chemical resistant apron and gloves.

(2) Eye protection - use a full face shield and do not wear contact lenses.

(3) In the presence of heavy fumes, evacuate the area and call for assistance.

e. In area where spill occurs, shut down air conditioning and/or ventilation to the area if possible.

f. Alert personnel in the area and evacuate.

g. Immediately notify the Laboratory Safety Representative, the Administrative Officer and the Head of the Laboratory. The LSR, in conjunction with the Command Safety Officer, will determine the most effective and least hazardous approach to clean up and decontaminate.

2. PERSONNEL ORGANIZATION AND TRAINING

a. All laboratory personnel will be trained in use of chemical spill control pillows, fire blankets and spill kits.

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b. Annual training sessions in spill management will be conducted. These sessions will be coordinated, with documentation provided by the Laboratory Safety Manager to the Command Safety Office to. This documentation shall remain on file in the command and departmental training records.

3. ACID SPILLS - LARGE OR SMALL ACID SPILLS:

a. Spill Control Kit method:

(1) Commercial spill control kits shall be located in laboratory area or within the laboratory spaces.

(2) Complete instructions are included.

b. Neutralization method - this method is only satisfactory small spills:

(1) Cover the spill with sodium bicarbonate. Mix and add water if necessary.

(2) Assure neutralization by checking the pH with litmus paper or dipstick.

(3) Scoop up neutralized slurry and wash down the drain copious amounts of water.

(4) Wash the site of the spill with a sodium bicarbonate solution.

4. OTHER SPILLS. Consult the Command Safety Officer or Chemical Hygiene Officer for specific information.

TABLE V

FIRST AID FOR CHEMICAL SPILLS

1. CORROSIVE SPILLS TO THE SKIN.

a. Immediately remove any affected clothing and wash spills on the skin with copious amounts of water.

b. Less serious incidents may be handled in the sink, but serious spills necessitate disrobing under the **EMERGENCY SHOWER**.

c. Do not hesitate to take action. Persons involved in major spills, particularly if there is mucous membrane involvement, are apt to become disoriented and panicky due to the resultant severe pain. Observers must be prepared to act on the victim's behalf and even enter the emergency shower with the victim to help him disrobe and scrub all affected areas.

d. Never try to neutralize acids and bases on the victim. This invariably leads to more extensive injury.

2. CORROSIVE SPILLS TO THE EYES

a. Splashes of caustic materials to the eyes are extremely serious. Action must commence immediately to prevent permanent injury.

b. Rinse the eyes (eyes must be held open, if not by the victim, then by an observer) for at least 15 minutes, then seek immediate medical attention. Eyewash stations are best, but an ordinary sink faucet is satisfactory. Squeeze bottle eyewashes are prohibited in the laboratory spaces.

c. After taking the above stated action, the victim should report immediately for emergency medical treatment. The victim's supervisor should report to the Laboratory Safety Officer to complete all required incident reports.

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TABLE VI

INCOMPATIBLE CHEMICAL STORAGE AND REACTIONS

Acetic Acid - with chromic acid, nitric acid, hydroxyl-containing compounds, ethylene glycol, perchloric acid, peroxides and permanganates

Acetone - with concentrated sulphuric and nitric acid mixtures

Acetylene - with copper (tubing) fluorine, bromine, chlorine, iodine, silver, mercury and their compounds

Alkali Metals - such as calcium, potassium and sodium with water, carbon dioxide, carbon tetrachloride, and other chlorinated hydrocarbons

Ammonia, Anhydrous - with mercury, halogens, calcium hypochlorite, hydrogen fluoride

Ammonium Nitrate - with acids, metal powders, flammable liquids, chlorates, nitrates, sulphur and finely divided organics or combustibles

Aniline - with nitric acid, hydrogen peroxide

Bromine - with ammonia, acetylene, butadiene, butane, hydrogen, sodium carbide, turpentine and finely divided metals

Carbon activated with calcium hypochlorate all oxidizing agents

Chlorates - with ammonium salts, acids, metal powders, sulphur, finely divided organics or combustibles, carbon

Chromic Acid - with acetic acid, naphthalene, camphor, alcohol, glycerine, turpentine and other flammable liquids

Chlorine Dioxide with ammonia, methane, phosphine, hydrogen sulfide

Chlorine - with ammonia, acetylene, butadiene, benzene and other petroleum fractions, hydrogen, sodium carbide, turpentine and finely divided powdered metals

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Copper - with acetylene, hydrogen peroxide

Cyanides - with acids and alkalies

Flammable Liquids - with ammonium nitrate, chromic acid, hydrogen peroxide nitric acid, sodium peroxide, halogens

Hydrogen Peroxide - with copper, chromium, iron, most metals, or their respective salts, flammable fluids and other combustible materials, aniline and nitromethane

Hydrogen Sulfide - with fuming nitric acid, oxidizing gases

Hydrocarbons, General - with fluorine, chlorine, formine, chromic acid, sodium peroxide

Iodine - with acetylene, ammonia

Mercury - with acetylene, fulminic acid, hydrogen

Nitric Acid - with acetic, chromic and hydrocyanic acids, aniline, carbon, hydrogen sulfide, fluids or gases & substances which are readily nitrated

Oxygen - with oils, grease, hydrogen flammable liquids, solids and gases

Oxalic Acid - with silver, mercury

Perchloric Acid - with acetic anhydride, bismuth and its alloys alcohol, paper, wood and other organic materials

Phosphorous Pentoxide - with water

Potassium Permanganate - with glycerine, ethylene glycol, benzaldehyde, sulfuric acid

Silver - with acetylene, oxalic acid, tartaric acid, ammonium compounds

Sodium Peroxide - with any oxidizable substances, for instance; methanol, glacial acetic acid, acetic anhydride, benzaldehyde, carbon disulfide, glycerine, ethylene glycol, ethyl acetate, furfural

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Sodium - with carbon tetrachloride, carbon dioxide, water

Sulfuric Acid - with chlorates, perchlorates, permanganates, and water

Substances listed in the left column should be stored and handled so that they cannot accidentally contact corresponding substances listed opposite them in the right column

Alkaline earth metals such as Carbon Dioxide, chlorinated sodium, potassium, cesium, hydrocarbons and water lithium

The halogens: Fl, Cl, Br, I and Ammonia, acetylene

Hydrocarbons

Acetic acid, hydrogen sulfide, Oxidizing agents such as analine, hydrocarbons, sulfuric chromic acid, nitric acid, acid, or any flammable liquid peroxides and permanganates.

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SECTION V

CARCINOGENS

1. Cancer is responsible for about 20% of all deaths and is the second leading disease-cause of death in the United States. Each year leading over 400,000 people die of cancer in the U.S. and almost twice that number of new cases is diagnosed. In recent years, increasing emphasis has been placed on determining the causes and reducing the occurrence of cancer through preventive measures. Included among causal factors; in addition to genetics and nutrition, are occupational, community and domestic exposures to carcinogenic substances.

2. Few of the greater than 50,000 synthetic substances available today have been thoroughly tested for their potential life-threatening effects, including carcinogenesis. Regardless, the first step toward reducing exposure to carcinogens is safe handling and disposal.

3. Only a small group of substances have been identified that are definite or suspected human carcinogens. Many more, however, are carcinogenic to varying degrees in animal models.

4. The following guidelines apply to carcinogens. All personnel will ensure the following:

a. Any carcinogenic substance which is not essential or which can be replaced by a less hazardous substance will be removed from the laboratory and the Authorized Users List as circumstances permit.

b. The level of hazard for each substance will be determined based on:

potency of the carcinogen,

(b) Amounts handled

Type of exposure,

Number of personnel involved,

(e) Chemical properties (e.g. volatility, etc.

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c. All personnel handling carcinogens are to be fully aware of the potential dangers.

5. In general, the following rules shall apply when handling potential carcinogens:

a. The amount of the chemical in use or in storage will be minimized.

b. Use will be restricted to designated areas by a small number of authorized personnel.

c. The chemical must be prominently labeled as a potential carcinogen.

d. General rules of laboratory and chemical safety will be strictly observed, including the following:

(1) Protective clothing (lab coats, tech jackets, etc.) will be worn

(2) Other protective equipment will be utilized, as appropriate (e.g. gloves, goggles, fume hoods, etc.)

(3) There will be no smoking, drinking, eating, mouth pipetting, or applying cosmetics in the laboratory. Likewise, touching or rubbing parts of the face is to be avoided.

(4) The hands should be washed with detergent immediately following procedures and before leaving the laboratory.

e. Should the skin become contaminated with a carcinogen, the area should be immediately washed with detergent. Use of the eyewash apparatus is recommended in cases of eye exposure.

f. If possible, carcinogenic substances will be inactivated to safe substances (e.g. treatment with acid, alkali or bleach, as appropriate) prior to disposal in the sewer or regular trash. When not possible, carcinogens will be held in vessels labeled with the chemical name and hazard, and disposed of as prescribed by the Command Hazardous Material Plan. See Section XI, Waste Disposal and Hazardous Material of this manual.

g. Spills will be reported on the Mishap Report Form and clean-up shall be in accordance with guidelines specified in Table IV of this manual.

6. This section contains a listing of confirmed or questionable carcinogens:

a. CONFIRMED HUMAN CARCINOGENS (OSHA and IARC):

- 1-Acetyl Aminofluorene
- 4 - Aminobiphenyl
- (3) Arsenic and certain arsenic compounds
- (4) Asbestos
- (5) Benzene
- (6) Bezidine
- (7) Bis-chloromethyl ether
- (8) Chromium and certain chromium compounds
- 9) 3,3, Dichlorobezidine
- (10) Diethylstilbestrol
- (11) 4-dimethylaminoazobenzene
- (12) Ethyleneamine
- (13) Melphalan
- 14 Methylchloromethyl ether
- (15) 4,4-methylene bischloroaniline
- (16) Mustard gas
- (17) Alpha-naphthylamine
- 18) Beta-naphthylamine
- (19) 4-nitrobiphenyl

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SECTION VI

COMPRESSED GAS SAFETY

1. Compressed gas containers, when constructed, maintained and utilized according to Department of Transportation (DOT), National Fire Prevention Association (NFPA) and Compressed Gas Association (CGA) regulations, can be considered safe for their intended purposes. Severe hazards (explosion, high-velocity projectiles, release of flammable or toxic gas, etc.) can exist by the failure to observe proper procedures and working practices.

2. INSPECTING COMPRESSED GAS CYLINDERS.

a. At receipt and prior to use, all compressed gas tanks are to be inspected for:

(1) Proper labeling: Containers must be clearly marked with the name of the contents. Tanks with wired tags or color code only will not be accepted.

(2) The presence of the safety outlet cap. Safety caps must always be in place when pressure regulators are not attached.

(3) Corrosion of the cylinder or valve mechanism

4 Evidence of mishandling or damage of any sort

(5) Evidence of leaks

b. If the cylinder inspection is not completely satisfactory, return the cylinder to the supplier immediately. No exceptions

3. TRANSPORTING COMPRESSED GAS CYLINDERS.

a. Never lift a tank by the safety cap, valve or pressure regulator.

b. Prior to transporting, remove the pressure regulator, replace cap.

c. Use a hand truck at all times, preferably one that cannot

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be upset. The tank must be secured to the hand truck. Never roll or drag gas cylinders.

4. STORAGE OF COMPRESSED GAS CYLINDERS

a. Whether stored in the Receiving Area or in use in the laboratory, compressed gas cylinders will be firmly and independently secured to racks or walls (preferably secured at the bottom and middle of the cylinder).

b. Use within the laboratory:

(1) Compressed gas cylinders, particularly those containing flammable gases, should be stored at remote locations.

(2) In the event that # (1) is not possible, single flammable gas cylinders inside lab spaces will not exceed the following capacities (College of American Pathologists regulations):

a LP gases - 5 lbs.

(b) Acetylene - 3.5 cu. ft

(b) Other flammable gases - Cylinder styles E
4-1/4" x 26" or Q (7"x 31").

(3) The number of flammable gas cylinders in the laboratory should be kept to a minimum. At most, one minimally sized cylinder in use and one minimally sized cylinder in reserve are allowed in a given laboratory space for a single flammable gas.

(4) Flammable gas cylinders are to be located more than 20 feet from significant quantities or flammables liquids or other combustibles.

c. Remote storage:

(1) Maximum gas cylinder capacities for flammable gas storage at remote locations are as follows, unless otherwise specified, (NFPA regulations):

(a LP gases - 5 lbs

(b) Other flammable gases 356 cubic feet or a water volume of 0.6 cubic feet.

(2) If cylinders are stored inside a building, they should be located in a separate, well ventilated, fire resistant (see NFPA regulations) room or enclosure.

(3) Cylinders may be stored in well ventilated outdoor spaces as long as access to them is restricted and they are protected from combustibles and sources of corrosion (e.g. moisture and salt especially on the bottoms). Dry, cool locations are optimal, but cylinders may be stored in the sunlight where temperatures are not extreme (consult supplier).

(4) Within storage areas, cylinders of each type of gas should be grouped together, clearly labeled "full or empty".

5 CRYOGENIC GASES

a. Liquid nitrogen is the only commonly used cryogenic laboratory gas and is stored in special, multi walled vacuum containers.

b. Dispense liquid nitrogen very slowly and use only approved line or hose.

c. Because of the danger of instant frostbite, the use of insulated gloves and eye protection is required.

6. COMPRESS GAS CYLINDER SET-UP AND USE.

a. Only properly trained personnel should set up compressed gases for use.

b. Make sure the gas is properly identified

c. Make sure the valve has an appropriate safety pressure release device.

d. Always use a pressure regulator. Different gases require different pressure regulators, which may not be interchangeable. Make sure the regulator in use is approved for the intended gas.

e. Never lubricate or force fittings. Use only the proper tools.

f. After the regulator is attached, open the main valve SLOWLY to the full open position. Never force the valve. Because of the possibility of blowout, especially during set-up, always point dial faces and gas outlets away from personnel. Valves, regulators, and tanks can become high velocity projectiles, so be sure to take the appropriate cautions.

g. Check fittings for leaks, before and after attaching regulator, by using soapy water or a commercial leak detecting solution. **NEVER USE A FLAME**. If leaks cannot easily be corrected by tightening fittings, shut the main valve and do not use until the equipment is replaced or repaired. If closing the main valve cannot stop the leak, take appropriate action to protect personnel and contact the supplier.

h. Close the main valve when the gas supply will not be in use not in use or if the laboratory is going to be closed for any length of time.

i. Cylinders should never be used for anything but their intended purpose.

j. Never couple different gases together or transfer gas between cylinders.

k. Never attempt repair of cylinders, valves or regulators.

l. Manifolds to connect a cylinder of gas to different outlets are permissible but only if properly designed and approved for the intended purpose.

7. EMPTY CYLINDERS.

a. When a cylinder is empty, obscure the identification label with another label clearly stating '**EMPTY**'.

b. Remove the regulator and replace the safety outlet cap.

c. Empty cylinder valves should remain closed to prevent contamination

d. Return the empty cylinder promptly to the appropriate storage location and secure in place.

8. DOT AND CGA COMPRESSED GAS CYLINDER LABELING REQUIREMENTS. An approved stick-on label with the following information will be present:

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- a. Name of the gas.
- b. Hazard: oxidizing, flammable, cryogenic, etc
- b. Name of the supplier

TANK COLOR CODES

GAS	COLOR	GAS	COLOR
NITROGEN	BLACK	HYDROGEN	RED
OXYGEN	GREEN	CO2-O2	GRAY-GREEN
CARBON DIOXIDE	GRAY	He-O2	BROWN-GREEN
NITROUS OXIDE	BLUE	AIR	YELLOW
CYCLOPROPANE	ORANGE	O2-N2	GREEN BLACK
HELIUM	BROWN		

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SECTION

FIRE PREVENTION AND SAFETY

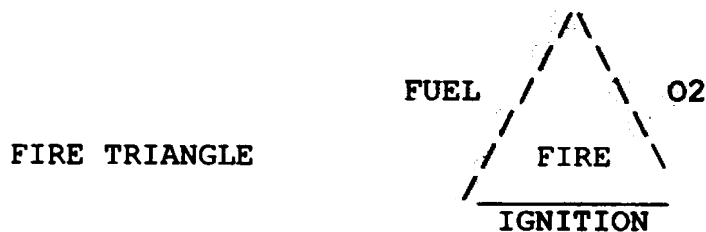
1. Within the laboratory environment there exists numerous and dangerous fire hazards. Fires can be prevented on most occasions by simply following established fire safety practices.

2. All personnel are expected, without exception, to be familiar with all aspects of fire prevention and safety as outlined in this section. Periodic fire drills shall be conducted in the command. Fire drills are normally coordinated and executed by the Command Safety Officer and/or Command Fire Marshal. Any individual within the command may be questioned on their knowledge of fire procedures and tested on their ability to take action.

3. GENERAL INFORMATION

a. FIRE:

(1) Definition: Fire is the rapid oxidation of a fuel (e.g. flammable material) by an oxidizer (e.g. O₂), in the presence of an ignition source (e.g. flame, spark, heat, etc.)



Fires occur when all three sides of the "fire triangle" are present.

(2) In the laboratory, all three elements of the fire triangle are always present. The key to fire prevention, therefore, is to prevent the simultaneous convergence of these three elements.

(3) Classes of Fires:

(a) CLASS - A: Ordinary, combustible materials such as wood, plastic, textiles and paper.

(c) CLASS - B: Flammable liquids and gases.

(d) CLASS C: Fires in energized electrical equipment.

(d) CLASS - D: Combustible and reactive metals.

b. EXTINGUISHERS.

1) Extinguishers must be clearly labeled as to CLASS.

(2) Different classes of extinguishers correspond to the classes of fires they extinguish:

(a) CLASS - A: Loaded stream, water, multipurpose dry chemical. **NEVER USE WATER ON CLASS B or C FIRES**

(b) CLASS - B: CO2 dry chemical, also Halon 1301 or Halon 1211).

(c) CLASS - C: CO2 dry chemical, (also Halon 1301 or Halon 1211)

(d) CLASS -D: Special, non-reactive dry powder media

(3) All personnel shall receive fire extinguisher training annually.

4. FIRE PREVENTION AND SAFETY MEASURES

a. All assigned personnel must be familiar with:

(1) All classes of fires.

(2) Classes and locations of fire extinguishers and when and how to use them.

3) Locations of red Fire Alarm boxes

(4) Locations of safety showers and fire blankets.

(5) Posted evacuation instructions and evacuation routes

b. Smoking is not permitted within any laboratory or general

office space at NMRCD

c. All personnel must be aware of all sources of ignition including flames, cigarettes, heating elements and spark gaps (motors, light switches, static electricity and automated machinery).

d. Take all necessary precautions to assure that flammable materials, especially flammable liquids and their vapors, do not contact sources of ignition.

e. The Command Safety Officer, in conjunction with the Facility Department, is to assure that fire extinguishers, safety showers and fire blankets are adequate in number, type, location and size, as applicable.

(1) Extinguishers are checked monthly by the Facility Department.

(2) Extinguishers are to be inspected and certified annually by a qualified civilian contractor who specializes in fire extinguisher maintenance.

f. All aisles, doorways and exits must remain unobstructed at all times. Exit routes are to be clearly marked by exit signs and/or lighted directional signs.

g. Electrical gang plugs and extension cords are not to be used except under extenuating circumstances. Their usage, if occurring, will only be temporary until immediate corrective action is taken to provide safe and proper electrical outlets.

h. Flammable liquids. All personnel shall be familiar with the proper handling and storage procedures for flammable liquids prior to their utilization. Personnel must first review the Material Safety Data Sheets to become knowledgeable of the hazards and restrictions associated with their utilization.

i. Flammable gases. All personnel shall be familiar with the proper handling and storage procedures for flammable gases prior to their utilization. Personnel must first review the Material Safety Data Sheets to become knowledgeable of the hazards and restrictions associated with their utilization.

5. IN EVENT OF FIRE. In the event of a fire at NMRCD Laboratory the principle actions are to ensure the safe and timely evacuation of personnel. Second, to prevent additional damage to

equipment and property. The following steps are to be taken:

a. The fire response and evacuation procedures will follow the "R-A-C-E" principle in providing immediate action.

(1) "R"emove all personnel from the immediate vicinity of the fire. Laboratory animals will be evacuated if necessary in accordance with the established disaster plan. However, do not jeopardize yourself and other personnel in attempting to save them.

(2) "A"larm. Sound the alarm by:

(a) Pulling the closest fire alarm (pull the handle down the full length of travel and release).

(b) From the SAFE location, call the reception desk, and/or the Command Duty Officer. Identify yourself, give the location, and type of fire.

"UNDER NO CONDITION WILL THE ALARM BE SILENCED UNTIL TOLD TO DO SO BY THE COMMAND SAFETY OFFICER OR COMMAND DUTY OFFICER"

(3) "C"lose all doors to the space to contain the fire.
Do Not Lock the door

(4) "E"xtinguish, if possible. Locate the nearest fire extinguisher appropriate for the fire. Remember, NEVER use water-based extinguishers on an electrical fire. Test its operation with a short burst, check that the door to the space is cool to the touch, then enter the space low and attempt to extinguish the fire. If unable to extinguish the fire, secure the space and wait for the Fire Department.

(5) Muster all personnel at the designated assembly area. To ensure accountability of personnel each department head or supervisor will immediately muster their personnel and report the results to the Muster Officer.

6. FIRE, EVALUATION AND CONTROL. Fires can instantaneously accelerate and overwhelm you in a very a few seconds with smoke, toxic fumes, heat, flame or explosion. Don't be a hero and don't take chances. Take control only of those fires that are clearly small and isolated. If the fire is large or involves highly hazardous materials (e.g. flammable gas cylinders, large volumes of flammable liquids, etc.), GET OUT IMMEDIATELY! It will be

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helpful to inform the firemen, upon their arrival what kind of materials are involved in the fire.

a. Solid Combustibles - CLASS A:

(1) Small objects may be handled with insulated gloves and extinguished with water or CO2

(2) Larger fires will require water or dry chemicals

b. Flammable Liquids - CLASS B:

(1) DO NOT USE WATER

(2) CO2 is only effective on small fires.

(3) Dry chemicals are most effective

b. Flammable gases - CLASS B:

1 Shut off source, if it can be done safely.

(2) Blow out flame with CO2. This may be impossible until source is shut off.

(3) Keep flames from other tanks, if possible

c. Electrical - CLASS C

(a) DO NOT USE WATER AS YOU MIGHT BE ELECTROCUTED

(b) CO2 is the best fire retardant agent

(c) Dry chemical is safe and effective but it may ruin instrumentation.

(d) Shut off electrical current, if it can be safely

7 FIRST AID:

a. Burning clothing or burning flammables on the skin. Rip off light clothing (if necessary) with concurrent use of one of the following methods:

(1) First choice - use EMERGENCY SHOWER, or

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(2) Roll victim on the floor, an effective means for smothering flames, or

(3) Wrap victim in a fire blanket, the pressure of a fire blanket over burning clothing may increase burn damage. Use a blanket only if a shower is not immediately available or other methods have failed.

b. Apply cold water to first and second degree burns to relieve pain and to minimize damage. Never apply ointments or other topical remedies to burned skin.

c. Administer CPR to victims with cardiac and/or pulmonary arrest.

d. Evacuate injured personnel to a medical treatment facility as soon as possible.

SECTION VIII

ELECTRICAL SAFETY

1. Standard alternating current is found everywhere. It is particularly dangerous because 60 Hertz current is easily able to induce ventricular fibrillation if current flows across the heart. Ordinarily, personnel in the lab are partially protected from becoming part of an electrical circuit for three reasons:

a. Properly maintained electrical equipment and outlets usually do not provide a source of current.

b. Personnel are usually not well grounded.

c. Dry skin has a very high electrical resistance.

d. A breach in one or more of the above circumstances significantly increase the chance of serious electrical shock

2. The damage done by electrical shock depends on many factors, such as current path and duration, but the most important factor is the amount of current (amperes or amps) that flow. The following figures point out that small amounts of electrical current can have serious and even fatal effects:

a. 1 milliamptingle sensation.

b. 16-20 milliampsmuscular paralysis (can't let go).

c. 100 milliampsventricular fibrillation

d. For comparison, the standard 20 amp household circuit breaker will allow 20 amperes of current to flow before interrupting the circuit. THAT'S 20,000 MILLIAMPS!!! It's obvious that circuit breakers are not designed to protect people from electrical shock.

3. PRECAUTIONS.

a. Report all shocks, no matter how small. If you feel a tingle from equipment, discontinue using immediately and unplug or turn off the power. Have the equipment examined by properly trained personnel prior to reuse.

b. Eliminate abnormal sources of current:

(1) All instruments and electrical appliances (except for plastic and double-insulated models) should have a 3-wire power cord and 3-prong plug. With the 3-wire system, if internal current is leaking to exposed external metal parts, the breaker will interrupt the circuit. The third or "ground" wire serves this purpose. Never remove the grounding prong and always use a standard, grounded three prong receptacle or suitable adapter.

(2) All instruments and receptacles must be checked for proper polarity, current leakage and ground integrity at least annually.

(3) Protect cords from traffic and other sources of wear. Extension cords are generally not allowed. Never use a frayed cord.

(4) Never bypass electrical safety devices on machines.

(5) If moisture falls on electrical equipment, cut the power and dry all parts before using. Water is a great conductor and may contact energized parts.

c. Avoid being grounded:

(1) Sources of grounding include metal pipes and drains, as well as conductors touching them particularly water. Stay away from these items when working with electrical equipment.

(2) Stand on a dry surface at all times. Depending on construction, floors may or may not be good conductors. Don't help complete the circuit with water.

d. Keep skin dry and protect cuts. The skin of dry hands has a resistance of approximately 100,000 ohms. This falls drastically to 1000 ohms when the skin is wet. Also, cuts circumvent this resistive barrier.

e. Only authorized, properly trained personnel will perform electrical repairs on instruments or on the electrical supply.

f. Use ground fault interrupters in all areas where electrical equipment is used under damp or otherwise hazardous conditions (e.g. boiler room, cage washing area, glassware, media prep and drivers watch room). Ground fault interrupters are part of the outlet and a few milliamps of leaking current will cause interruption of the circuit.

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g. Remember that all electrical hazards are also fire hazards as well.

Never use gang plugs that may overload circuits.

(2) Never use nonexplosion-proof electrical equipment around flammable solvents.

Avoid the use of extension cords.

4 ELECTRICAL ACCIDENTS.

a. DON'T BECOME PART OF A CIRCUIT AND AN ADDITIONAL VICTIM!

b. Shut off electricity to the involved equipment or to the entire area if necessary. If this is not possible and the victim is still in contact with electricity, be very careful but separate the victim and the electrical source if possible, with an insulated, non-conducting extension (e.g. wood, glass, plastic trash can, etc.).

c. Administer CPR if the victim has arrested and obtain medical assistance as needed.

d. Obtain assistance from authorized, properly trained personnel to evaluate the problem prior to turning power back on.

SECTION IX

HAZARD COMMUNICATION STANDARD

1. The transmission of information regarding the hazards of chemicals, the safe storage, handling, use and disposal of hazardous materials is the responsibility of all supervisors and NAMRU-2 employees.

2. All significant aspects of this standard are included in the "Chemical Hygiene Plan". Some aspects of the program are listed below to emphasize the importance of this standard.

a. MATERIAL SAFETY DATA SHEETS (MSDS).

(1) Copies of MSDS for all hazardous substances to which employees of this laboratory may be exposed are kept in a designated area of the laboratory or with a copy of the Laboratory Safety Manual. The Laboratory Safety Representative (LSR) for each laboratory shall be responsible for obtaining and maintaining the data sheet file for that section. Such efforts may be coordinated through the Laboratory Supervisor, the Command Safety Officer, or the Chemical Suppliers.

(2) MSDS are to be made available for review by all employees. This review may be accomplished at any time during their shift. If MSDS are not available or new hazardous substance(s) in use do not have a MSDS, contact the LSR, Laboratory Supervisor, the Chemical Hygiene Officer and the Command Safety Officer immediately. Cease using the hazardous agent until a current MSDS can be obtained and kept readily available.

b. EMPLOYEE INFORMATION AND TRAINING

(1) All personnel (whether they are foreign service nationals, contracted, trainees or collaborators) are to receive a health and safety orientation prior to starting work, and on a periodic basis, to include the following elements:

(a) A summary of the standard and this safety manual

(b) Hazardous chemical properties

(c) Physical and health hazards associated with exposure to workplace chemicals (Right-To-Know),

(d) Protection procedures against hazards including personal protective equipment, work practices and emergency procedures,

(e) Hazardous chemical spill and leak procedures

(f) location of MSDSs, with an explanation of their content, and methods for employees to obtain and use the appropriate hazard information.

(2) When new hazardous substances are introduced, training for the new hazard should be performed promptly.

3. INVENTORY OF HAZARDOUS SUBSTANCES. The laboratory warehouse, and animal facility will maintain an inventory of all known hazardous substances (in addition to the MSDS on each substance). This list is to be maintained and edited as chemicals are added to or deleted from the NAMRU-2 inventory. Annual updates will be submitted to the Command Safety Office through the Laboratory Safety Officer.

4. HAZARDOUS NON-ROUTINE TASKS. Periodically, employees are required to perform hazardous non-routine tasks. Prior to starting work on such projects, each affected employee will be given information by their supervisor about hazards to which they may be exposed during such an activity. This information shall include:

a. Specific hazards.

b. Protective/safety measures which must be utilized

c. Measures the laboratory has taken to lessen the hazards including ventilation, respirators, presence of another employee and emergency procedures.

SECTION X

ACCIDENT AND INCIDENT REPORTING

1. Notification of Mishaps.

a. All work related injuries, illnesses and property damage accidents, sustained by civilian and military personnel will be promptly reported to the immediate supervisor and/or department head. The Laboratory Safety Representative or supervisor will immediately complete the Accident/Incident Mishap Report form and submit the report to the Biological Safety Officer and to the Command Safety Officer. The Biological Safety Officer will ensure that the appropriate medical treatment is provided. The Command Safety Officer will ensure that the required investigations, reports and procedures as specified in the Command Safety Program Manual are complied with.

2. Severity Classification of Mishaps

a. Class A Mishap:

(1) Cost of property damage and personal injury is \$500,000 or greater.

(2) Injury/occupational illness results in fatality or permanent total disability.

b. Class B Mishap:

(1) Cost of property damage and personal injury is \$100,000 or more but less than \$500,000.

(2) Injury/occupational illness results in permanent partial disability or hospitalization of 5 or more personnel.

c. Class C Mishap:

(1) Cost of property damage and personal injury is \$10,000 or more but less than \$100,000.

(2) Injury/occupational illness results in a lost workday case with days away from work.

d. Class D Mishap:

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(1) Cost of property damage and personal injury is less than \$10,000

(2) Injury/occupational illness results in a lost workday case with days of restricted work activity or a non-fatal case without lost workday.

3. Reportable accidents/incidents include

- a. Every personnel accident injurious or non-injurious)
- b. Accidents resulting in damage to instruments or the building.
- c. Situations and/or conditions which have the potential for injury, hazard to health or damage to the property.

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SECTION XI

WASTE DISPOSAL AND HAZARDOUS MATERIALS

HAZARDOUS MATERIAL.

a. The Biological Safety Officer and the department supervisors shall maintain an inventory of hazardous materials categorized into at least the following sections:

1 Allergens and Embryotoxins

(2) Chemicals of moderate chronic or high acute toxicity.

Chemicals of high chronic toxicity

A copy should be made available for the Command Safety Office.

b. Material Safety Data Sheets (MSDS). The MSDS's are documents that provide information describing:

(1 The physical and chemical properties of products,

Their physical and health hazards, and

Precautions for safe handling, use and disposal

c. MSDS's shall be prepared by the manufacturer and shall accompany the products during shipment and must be maintained in the workplace. All personnel must understand the contents of the MSDS and know their location within the workplace.

2. DISPOSAL OF CHEMICAL WASTE.

a. Individual hazardous properties of chemicals vary due to the degree of toxicity, quantity, chemical state, etc. Contact the Command HAZMAT Coordinator for the procedures of disposing of hazardous material/waste.

3. DISPOSAL OF INFECTIOUS WASTE.

a. Infectious waste. Defined as all human and animal body fluids, excretions, blood, blood products and tissues, and any objects, such as specimen containers, swabs, dressings, needles, syringes or culture related materials that are contaminated by

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any item as listed above

(1) Care must be exercised in the disposal of these materials. At the end of each working day, or more frequently if necessary, containers are double-bagged in biohazard bags and removed by housekeeping personnel for incineration.

(2) Personnel assigned to dispose of infectious waste must take appropriate steps to:

(a) Avoid aerosol production and splashing.

(b) Protect themselves through the utilization of the correct personal protective equipment.

c. Biological waste. Laboratory waste such as culture plates, culture tubes, sputum cups, gauze and cotton swabs are sterilized by autoclaving and then incinerated.

d. Non-Infectious waste. Non-infectious waste does not present a health hazard. It can be removed by housekeeping personnel from the laboratory and immediately transported directly for incineration. Bags should never be filled to the point where tearing may occur due to weight. Broken glass or needles are not to be placed in these containers.

e. Residual reagents. Residual reagents are disposed of as hazardous materials as outlined in section XI, paragraph 2, DISPOSAL OF CHEMICAL WASTE.

f. Capillary Tubes. Capillary tubes are placed in designated broken glass containers for removal by housekeeping personnel and eventual incineration.

g. Needles, syringes, scalpel blades, razor blades and other disposable metallic items.

(1) Discarding these items in plastic bags is prohibited.

(2) These items are placed directly into designated red safety disposal or "sharps" containers.

(3) All syringes and needles are to be placed, without clipping or recapping directly into designated red safety disposal containers.

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(4) Containers are then sealed, placed in a biohazard bag, and transported by department personnel to the autoclave area for autoclave and incineration.

(5) Transfer of these items from one container to another is prohibited

h. Disposable pipettes.

1 Discarding pipettes in plastic bags is prohibited.

(2) Disposable pipettes shall be placed in a suitable cardboard box clearly labeled as "Broken Glass".

(3) "Broken Glass" boxes are to be sealed and double-bagged for removal by housekeeping personnel for incineration.

(4) Transfer of pipettes from one containers to another is strictly prohibited.

i. Urine.

(1) These specimens are flushed down the sink drain with copious amount of water.

(2) Disposable urine containers are handled as specified in paragraph 3a.

j. Stool and vomitus. Stool and vomitus are disposed as infectious waste products and their containers as specified in paragraph 3a.

k. Petri dishes. All petri dishes are autoclaved prior to being disposed by incineration.

l. Broken glass. All broken glass, whether contaminated or not, is placed in a suitable cardboard box which is clearly labeled as being "Broken Glass". The boxes are sealed and then double-bagged for removal by housekeeping personnel and then incinerated. Transfer of broken glass from one container to another is strictly prohibited.

m. Waste paper and boxes. Waste paper and boxes that are not contaminated with respect to biological, chemical and radioactive hazard shall be treated as non-infectious waste. This material shall be disposed of in the manner for non-infectious waste. It is essential that personnel clearly

understand and separate this material from infectious items

n. Laboratory Waste Disposal Containers. Waste disposal containers will be clearly marked to indicate whether the container is for infectious or "biohazardous" waste or non-infectious waste. All Infectious waste containers and bags will carry the biohazard label and remain separated from the non-infectious waste containers.

4. STORAGE AND DISPOSAL OF HAZARDOUS FLAMMABLE WASTE

a. Flammable Liquids Storage. Flammable liquids are liquids that have a flash point less than 100 degrees Fahrenheit. The following procedures are to followed when storing flammable liquids:

(1) Flammable liquids can only be stored in containers approved for such use. Before transferring a flammable liquid to a container other than the manufacturer's, check to see if the container is approved for flammable liquids.

(2) It shall be the NMRCD policy that flammable liquids exceeding one's "working stock" (1 bottle or a two day supply) are to be stored in approved flammable storage cabinets. Guidelines established by the National Fire Protection Association (NFPA) recommend that the amount of flammable liquids stored outside flammable storage cabinets be limited to 2 gal/100 ft² of laboratory space for low hazard labs and 5 gal/100 ft² for intermediate hazard labs. OSHA does not address the storage of flammables outside cabinets in research laboratories. However, twenty-five gallons is the absolute maximum quantity of flammable liquids that OSHA allows outside of an inside storage room or storage cabinet located in a building (or in any one fire area of a building) at industrial plants.

(3) Flammable storage cabinets must be maintained properly. Cabinets are generally of a double-walled construction and made of 18 gauge steel. The doors are two inches above the base and the cabinet is liquid proof to that point. Two vents provided on opposite sides of the cabinet and are equipped with flame-arrester screens. Unless the cabinet is vented to the outdoors with hard piping, these vent holes are to remain capped. Always read the manufacturer's information and follow some prudent safety practices such as:

(a) Store only compatible materials inside the flammable storage cabinet. Check the MSDS or an incompatibility

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chart for information on the compatibility of a chemical. Do not store oxidizers like bleach with flammables.

(b) Do not store paper or cardboard inside cabinets with the hazardous material.

(c) Do not overload the flammable storage cabinets. Not more than 60 gallons of class I (flash point <100F) or class II (flash point > 100 and < 140F) liquids, nor more than 120 gallons of class III liquids (flashpoint >140 F) may be stored in a storage cabinet.

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SECTION XII

BIOLOGICAL AGENTS INFECTION CONTROL

1. Although the rate of laboratory-acquired infections is low, the significant morbidity and mortality associated with certain infections, such as TB or hepatitis, require a cautious and an educated approach to microbiologic hazards. To ensure infection control from biological agents remains at a minimal risk to personnel universal precautionary measures remain effect to safeguard against laboratory-acquired infections.

a. Possible routes of infections are:

1 Airborne droplets and aerosols

2) Ingestion.

Direct inoculation (scratches or puncture wounds)

Direct skin or mucous membrane contact

(5) Vectors (e.g. ticks and fleas).

b. The general requirements for personnel and laboratory safety outlined in Section II of this manual shall be adhered to and followed without exception.

2. SPECIMEN AND REQUISITION HANDLING

a. Specimen containers and associated paperwork that are grossly soiled with body fluid will not be accepted.

b. Containers of specimens collected in the accessioning area become extremely contaminated, the contaminated surface should be wipe clean with a suitable disinfectant (e.g. 10% bleach) prior to accessioning.

c. Contamination of specimen related paperwork is to be avoided.

d. Blood tube stoppers may be reused but must be sufficiently disinfected and cleaned prior to reuse.

e. All specimen containers should be sealed when not in use.

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f. Infectious wastes will be disposed of as described in SECTION XI, WASTE DISPOSAL AND HAZARDOUS MATERIALS.

g. To avoid aerosols:

(1) Remove container lids and stoppers slowly behind plexiglass shield.

(2) Do not forcefully expel fluid contents from pipettes or syringes.

(3) Needles should be removed from syringes prior to expelling contents into open containers.

3. SPECIAL INFECTIOUS HAZARDS. Recommendations from CDC emphasize the need to treat blood and other body fluids from all patients as potentially infective with regards to infectious diseases such as AIDS and Hepatitis. Implementation of Universal blood and body fluid precautions for all patient specimens eliminates the need for warning labels. It is now the risk inherent in the failure to label all specimens, thus providing a false sense of security to laboratory personnel when a label is not evident. ALL SPECIMENS ARE CONSIDERED INFECTIVE.

a. Specimen collection.

(1) All phlebotomists shall wear disposable gloves during specimen collection. When soiled, the gloves should be discarded, hands washed, and new gloves put on prior to the next phlebotomy. To prevent accidental needle stick injuries, needles must not be recapped, purposely bent or broken by hand, removed from disposable syringes, or otherwise manipulated by hand. After they are used, puncture resistant containers. These containers should be located as close as possible to the use area.

(2) Care should be taken when collecting each specimen to avoid contaminating the outside of the container and of the laboratory form accompanying the specimen. Specimen containers that are externally contaminated are to be cleaned with appropriate germicidal solution (10% bleach or LPH). Specimen requisitions that are contaminated should be discarded and replaced.

b. Specimen processing.

(1) Masks and protective eyewear should be worn if mucous membrane contact with blood or body fluids is anticipated.

All persons processing blood and body-fluid specimens (e.g. removing tops from vacuum tubes) should wear gloves.

(2) For routine procedures, such as histologic and pathologic studies or microbiologic culturing, a biological safety cabinet is not necessary. However, biological safety cabinets (Class I or II) should be used whenever procedures are conducted that have a high potential for generating droplets. These include activities such as vigorous shaking.

(3) All specimens being centrifuged should be capped to prevent aerosols. Centrifuges should not be opened until spinning has completely stopped.

(4) There is to be strict adherence to standard laboratory safety procedure regarding hand washing, oral precautions, and laboratory clothing, etc.

(5) The use of needles and syringes should be limited to situations in which there is no alternative and the recommendations for preventing injuries with needles outlined above should be followed.

(6) Spills are to be promptly disinfected with 10% bleach solution or LPH solution.

(7) All disposable contaminated items are to be discarded as infectious waste, including specimens and their sealed containers.

4. Miscellaneous Precautions.

a. Mechanical pipetting devices shall only be used for manipulating all liquids in the laboratory. Pipetting by mouth shall not be performed.

b. Laboratory work surfaces should be decontaminated, at minimum, daily, when work activities are complete or at the end of the day or immediately after a spill of blood or other body fluids. Decontamination should be with an appropriate chemical germicide (10% bleach or LPH solution).

c. Laboratory equipment that has been contaminated with blood or other body fluids should be decontaminated and cleaned before being repaired in the laboratory or transported to the manufacturer or Medical Repair.

d. All persons shall wash their hands after completing laboratory activities and should remove protective clothing before leaving the laboratory

5. CENTRIFUGES. The two major hazards presented by the centrifuges are aerosol formation and the production of high velocity missiles (broken specimens or machine parts). The following must be observed:

a. Do not operate centrifuges unless covers are closed.

b. Do not open the lid until the rotor has come to a complete stop.

c. Do not centrifuge uncovered specimen tubes

d. Disinfect the interior of the centrifuge frequently and always after spills. Disinfect with 10% bleach.

6. DISINFECTION/HOUSEKEEPING. Disinfection is the significant reduction of populations of disease-causing organisms and often does not destroy spores. Many commercial products are available and are acceptable as general laboratory disinfectants. To prevent aerosols, avoid dropping equipment into disinfectant baths. Gently submerge articles into the disinfectant. The disinfectants used at this laboratory are:

a. LPH - phenolic compounds (CAUTION: corrosive to skin). Appropriate for general bench tops, floors and other laboratory surfaces. Manufacturer's instruction should be followed.

b. Sodium hypochlorite (bleach). CAUTION: corrosive to metal.

c. Iodophores

d. Alcohol

e. Frequency of disinfection within laboratory work areas:

Bench tops, at least once a shift.

Floors, at least once a week.

(3) Spills and spatters (Table 1V).

(4) Reusable equipment, wash and disinfect between uses.

7. SPILLS OF INFECTIOUS MATERIALS

a. Specimen spills and spatters are to be cleaned up immediately.

b. Immediate actions:

(1) Clear the area at once

(2) Shut down air-conditioning and/or ventilation to the area, if possible.

(3) Notify the Laboratory Supervisor or Laboratory Safety Representative immediately.

c. "Dry" spills (overturned or broken culture plates) with no significant aerosol formation:

1 Evacuation of work space not indicated

(2) Flood area with disinfectant solution; allow to stand for 15 to 30 minutes.

(3) Soak up the disinfectant and contaminated material with an absorbent material (paper towels) and dispose of in an autoclave bag. Gloves and mask will be worn for clean up.

(4) Spill area should be thoroughly washed after clean up

(5) Autoclave the contaminated material. Treat as infectious waste.

d. Liquid spills on bench or floor.

(1) If significant aerosols were formed the area should be evacuated and not reentered for at least one hour.

(2) Cover the spill with an absorbent (paper towels) Gloves and mask will be worn.

(3) Dispose of the absorbent and contaminated material in an autoclave bag and autoclave. Treat as infectious waste.

4 The spill area should be thoroughly washed after

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clean up; disinfect for 15 to 30 minutes.

e. Centrifuge spills:

(1) Shut off instrument, evacuate work space at once, and shut down ventilation.

(2) Do not reenter area for at least one hour until aerosols have settled

(3) Personnel entering the area for clean up shall wear personnel protective equipment (PPE), i.e., protective clothing, gloves and mask.

(4) If liquids are present, soak up in an absorbent material (paper towel) and handle as in (3) above. If not, disinfect the instrument and clean the room thoroughly before resuming work.

(5) Place refuse in an autoclave bag and autoclave. Treat as infectious waste.

f. Spills in incubators, autoclaves or other closed area:

(1) Soak up liquids with an absorbent (paper towels) dispose of as in e(d) above.

(2) If routine clean-up is not possible, the need for decontamination and the method will be determined by the Laboratory Safety Officer and Command Safety Officer.

g. Accidents involving hazardous specimens are to be reported to the Biosafety Officer and Command Safety Officer as soon as possible.

7. BIOSAFETY LEVELS. The Center for Disease Control recognizes four levels of biosafety practices and has assigned most organisms to different levels according to pathogenicity and virulence:

a. Level I - organisms that are ubiquitous and do not cause disease in or colonize healthy adults.

b. Level II - moderate risk organisms that are common but are able to cause disease, particularly in compromised hosts (e.g. E. Coli, Staphylococcus, common viruses, etc.)

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c. Level III - moderate to high risk organisms that are likely to cause serious or lethal disease if contacted (e.g. TB, Histoplasma, etc.)

d. Level IV - extremely dangerous and exotic organisms (e.g. Lassa fever).

e. Loosen caps of any containers to allow equalization of

8. SPECIAL INFECTIOUS HAZARDS. Increased precautions should be taken when dealing with special infectious hazards.

a. Masks, head covers, eye protection and double gloves are to be used during necropsy cases presenting dangerous infectious hazards.

b. Infectious waste policies are to be strictly observed. Refer to Laboratory Precautions as specified in this Manual.

c. Tissue from highly infectious cases should be well fixed in 10% formalin prior to trimming.

d. Aerosols are to be avoided. The use of hand saws instead of electric equipment for cutting bone should be considered.

e. Remains presenting special infectious hazards should be conspicuously identified to protect other personnel.

f. Specimens removed at autopsy and submitted to the main laboratory must be labeled with caution stickers.

g. High risk or potentially high risk cases:

(1 Viral hepatitis

Jakob-Creutzfeldt disease

Acquired Immunodeficiency Syndrome

Tuberculosis

9. SPECIFIC INFECTIOUS HAZARDS:

a. Hepatitis virus

Formalin kills virus

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Prime problems are cuts and wounds

Obey all general rules.

(4) If skin is broken by contaminated instrument, wash vigorously with iodine-based disinfectant and report mishap immediately to Laboratory Safety Officer, Department Head and USNH Safety Officer.

b. Tuberculosis

(1) Formalin reduces infectivity but does not effectively kill mycobacteria

All exposed individuals must show status of PPD

Obey general rules.

(4) Contaminated lung must be infiltrated with formalin and not cut for at least 48 hours. Storage must be in a closed container, submerges and covered with formalin-soaked towels.

c. AIDS. Contact the Biosafety Officer for guidelines

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NMRCD MISHAP REPORT

DATE: TIME: HR TRACK #:

PLACE: _____

ESTIMATED MISHAP CATEGORY/CLASSIFICATION: _____

PERSONNEL INJURED OR EQUIPMENT DAMAGED: _____

TREATMENT: _____

ATTENDING PHYSICIAN: _____

DESCRIBE HOW ACCIDENT OCCURRED: _____

PERSON COMPLETING FORM: _____
(PRINT) (SIGNATURE)

SAFETY OFFICER COMMENTS: _____

COPY TO:
OIC
OCHLTH OFFICE

Enclosure (2)

OPNAV 5100-27

**THIS FORM IS PROVIDED FOR THE ASSISTANCE OF AN EMPLOYEE
AND IS NOT INTENDED TO CONSTITUTE THE ONLY METHOD BY WHICH A REPORT MAY BE SUBMITTED**

EMPLOYEE

REPRESENTATIVE OF EMPLOYEES

a. Navy installation/activity and mailing address

b. Building or worksite where alleged violation is located, including address

2. NAME AND FONE NUMBER OF GOVERNMENT SUPERVISOR AT SITE OF VIOLATION

3. DOES THIS HAZARD IMMEDIATELY THREATEN DEATH OR SERIOUS PHYSICAL HARM?

NO

YES

5. IF KNOWN, LIST BY NUMBER AND/OR NAME, THE PARTICULAR STANDARD (OR STANDARDS) ISSUED BY THE AGENCY WHICH YOU CLAIM HAS BEEN VIOLATED

6. TO YOUR KNOWLEDGE, HAS THIS VIOLATION BEEN THE SUBJECT OF ANY UNION/MANAGEMENT GRIEVANCE OR HAVE YOU (OR ANYONE YOU KNOW) OTHERWISE CALLED IT TO THE ATTENTION OF, OR DISCUSSED IT WITH, THE GOVERNMENT SUPERVISOR

NO	YES (List results, including any efforts by management to correct violation)

7. EMPLOYEE NAME (PLEASE PRINT OR TYPE CLEARLY)

8. EMPLOYEE SIGNATURE

9. EMPLOYEE ADDRESS

10. EMPLOYEE PHONE NUMBER

11. MAY YOUR NAME BE REVEALED?
NO YES

12. ARE YOU A REPRESENTATIVE OF EMPLOYEES?
 NO YES (List organization name)

13. DATE FILED:

Enclosure (3